

DOCKET NO.: 244562US26YA



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF:

Steven T. FINK, et al.

SERIAL NO: 10/811,912

GROUP: 1753

FILED: March 30, 2004

EXAMINER: Rodney G. MCDONALD

FOR: HONEYCOMB OPTICAL WINDOW DEPOSITION SHIELD AND METHOD
FOR A PLASMA PROCESSING SYSTEM

LETTER

Mail Stop DD
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Submitted herewith are an International Search Report and a Written Opinion for the Examiner's consideration. The reference(s) listed therein have been cited in the Office Action dated August 18, 2006.

Respectfully Submitted,

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US05/03032

A. CLASSIFICATION OF SUBJECT MATTER

IPC: C23C 14/34(2006.01);C23C 16/00(2006.01);H05H 1/00(2006.01)

USPC: Please See Continuation Sheet

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 204/192.32, 192.33, 298.11, 298.31, 298.32; 156/345.24, 345.25; 118/715, 723E, 712, 713; 216/59, 60, 67; 427/8, 10

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
NONE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	JP 2000-077395 (SAITO et al) 14 March 2000 (14.03.2000), Figure 6; Figure 2; Machine Translation 0021-0031, 0038, 0039.	1, 6, 7, 8, 19, 40, 41 ----- 2-5, 14, 15, 21-28, 34, 35, 39
Y, P --- A	US 6,798,519 B2 (NISHIMOTO) 28 September 2004 (28.09.2004), Column 7 lines 9-24.	9-13, 29-33 ----- 16-18, 20, 36-38

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"

document member of the same patent family

Date of the actual completion of the international search

16 August 2006 (16.08.2006)

Date of mailing of the international search report

20 SEP 2006

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

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Authorized officer

Rodney G. McDonald

Telephone No. 571-272-1300

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US05/03032

Continuation of USPC:

204/192.32,192.33,298.11,298.31,298.32;156/345.24,345.25;118/715,723E,712,713;216/59,60,67;427/8,10

PATENT COOPERATION TREATY

OBLON, SPIVAK, MCCLELLAND
MAIER & NEUSTADT P.C.
DOCKETING DEPT.

From the
INTERNATIONAL SEARCHING AUTHORITY

Initials/Date Locked: _____

Type of Resp(s): _____

Date: _____

PCT

To:
GREGORY J. MAIER
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT,
P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Applicant's or agent's file reference 244562WO 6		Date of mailing (day/month/year) 20 SEP 2006
International application No. PCT/US05/03032		International filing date (day/month/year) 27 January 2005 (27.01.2005)
International Patent Classification (IPC) or both national classification and IPC IPC: C23C 14/34(2006.01);C23C 16/00(2006.01);H05H 1/00(2006.01) USPC: Please See Continuation Sheet		Priority date (day/month/year) 30 March 2004 (30.03.2004)
Applicant TOKYO ELECTRON LIMITED		

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/ US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (571) 273-3201	Date of completion of this opinion 29 August 2006 (29.08.2006)	Authorized officer Rodney G. McDonald Telephone No. 571-272-1300
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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/US05/03032

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:

- ☒ the international application in the language in which it was filed
- ☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

a. type of material

- ☐ a sequence listing
- ☐ table(s) related to the sequence listing

b. format of material

- ☐ on paper
- ☐ in electronic form

c. time of filing/furnishing

- ☐ contained in the international application as filed.
- ☐ filed together with the international application in electronic form.
- ☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US05/03032

Box No. V Reasoned statement under Rule 43 *bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)

Claims 2-5, 14-18, 20-28, 34-39 YES

Claims 1, 6-13, 19, 29-33, 40, 41 NO

Inventive step (IS)

Claims 9-13, 16-18, 20, 29-33, 36-38 YES

Claims 1-8, 14, 15, 19, 21-28, 34, 35, 39-41 NO

Industrial applicability (IA)

Claims 1-41 YES

Claims NONE NO

2. Citations and explanations:

Please See Continuation Sheet

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US05/03032

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of USPC:

204/192.32,192.33,298.11,298.31,298.32;156/345.24,345.25;118/715,723E,712,713;216/59,60,67;427/8,10

V. 2. Citations and Explanations:

Claims 1, 6, 7, 8, 19, 40 and 41 lacks novelty under PCT Article 33(2) as being anticipated by anticipated by Saito et al. (Japan 2000-077395).

Regarding claim 1, Saito et al. teach an optical window deposition shield 22 comprising a backing plate 43 with a through hole; a honeycomb structure 22 having a plurality of adjacent cells configured to allow optical viewing through the honeycomb structure, each cell having an aspect ratio of length and diameter sufficient to impede a processing plasma from traveling the full length of the cell; a coupling device 44 configured to couple the honeycomb core structure 22 to the backing plate 43 such that the honeycomb structure is aligned with at least a portion of the through hole in the backing plate 43. (See Machine translation paragraph 0038, 0039, 0031; Figure 6)

Regarding claim 6, the shield can comprise aluminum. (See Machine Translation paragraph 0024)

Regarding claims 7, 8, the shield can be coated with a protective coating of aluminum oxide (i.e. anodized aluminum). (See Machine Translation paragraph 0024)

Regarding claim 19, the coupling device comprises at least one threaded fastener 44 fixed to the backing plate and configured to hold the honeycomb structure in contact with the backing plate. (See Figure 6)

Regarding claim 40, Saito et al. teach an optical window deposition shield 22 comprising means 22 for impeding processing plasma from traveling into contact with a viewing window 21 of a plasma chamber. Means 33 for holding the means for impeding 22 within an opening of a chamber liner 11 used in the plasma chamber. (See Fig. 2)

Regarding claim 41, Saito et al. teach a method of impeding a processing plasma from traveling into contact with a viewing window of a plasma chamber by providing a mounting hole in a liner of the plasma chamber and fixedly mounting a honeycomb structure within the mounting hole, the honeycomb structure having a plurality of adjacent cells configured to allow optical viewing through the honeycomb structure, each cell having an aspect ratio of length to diameter sufficient to impede a processing plasma from traveling through the full length of the cell. (See Figure 2; Machine Translation 0021-0031)

Claims 2-5, 14, 15, 21-28, 34, 35 and 39 lacks an inventive step under PCT Article 33(3) as being obvious over Saito et al. (Japan 2000-077395).

Saito et al. is discussed above and all is as applies above. (See Saito et al. discussed above)

The difference between Saito et al. and the present claims is that the backing plate comprising aluminum sheet metal is not discussed (Claims 2, 22), the backing plate comprising anodized aluminum is not discussed (Claims 3, 23), the backing plate coupled to the chamber liner such that the through hole is at least partially aligned with a hole in the chamber liner is not discussed (Claims 4, 24), the through hole substantially contours the hole in the chamber liner is not discussed (Claims 5, 25), where the honeycomb structure is

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US05/03032

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

configured to fit snugly into a hole in a plasma processing chamber liner to provide a deposition shield within the hole in the chamber liner is not discussed (Claims 14, 34), the cells of the honeycomb structure having an aspect ratio of about four or more is not discussed (Claims 15, 35), the shield being coupled to the chamber liner through a backing plate is not discussed (Claim 21) and the coupling device comprising at least one threaded fastener fixed to the backing plate and configured to hold the honeycomb structure in contact with the backing plate is not discussed (Claim 39).

Regarding claims 2, 22, as the liner shield 11 in Fig. 2 is shown to be the same material as the shield 22 the material of the liner shield is believed to be the same material as the shield 22. (See Fig. 2; Machine Translation 0024)

Regarding claims 3, 23, as the liner shield 11 in Fig. 2 is shown to be the same material as the shield 22 the material of the liner shield is believed to be the same material as the shield 22. (See Fig. 2; Machine Translation 0024)

Regarding claims 4, 24, in Fig. 6 a backing plate 43 is suggested for coupling the shield 22 with the chamber wall having the holes aligned. It is believed that this means 43 can be utilized in the embodiment of Figure 2 to couple the shield to the liner shield 11. (See Fig. 6 and Fig. 2)

Regarding claims 5, 25, the hole in the backing plate would contour the chamber liner 11 if the concepts of Fig. 2 and 6 were utilized together. (See Fig. 2 and 6)

Regarding claims 14, 34, in Fig. 2 the shield snugly fits in the chamber liner 11. (See Fig. 2)

Regarding claims 15, 35, the cells in the shield have an aspect ratio of four or more since the plasma is prevented from reaching the window. (see Machine translation paragraph 0031; Figure 2, 6)

Regarding claim 21, in Fig. 6 a backing plate 43 is suggested for coupling the shield 22 with the chamber wall having the holes aligned. It is believed that this means 43 can be utilized in the embodiment of Figure 2 to couple the shield to the liner shield 11. (See Fig. 6 and Fig. 2)

Regarding claim 39, the shield can be coupled by coupling devices 33 or 44 as shown in Figures 2 and 6.

Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to have utilized a chamber liner in combination with a shield as taught by Saito et al. because it prevents damage to the observation window.

Claims 9-13 and 29-33 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest the claimed subject matter.

Claims 16 and 36 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest the coupling device comprising a retaining flange that is detachably coupled to the backing plate by press contact when the backing plate is coupled to the chamber liner.

Claims 17, 18, 37 and 38 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest the coupling device comprising at least one retaining pin fixed to the backing plate and configured to engage at least one cell of the honeycomb structure when the honeycomb structure is pressed over the at least one retaining pin.

Claim 20 meets the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest the optical window deposition shield as claimed including a clip device configured to hold opposing ends of the honeycomb planar sheet together to form a substantially continuous liner of honeycomb material configured to line the chamber wall of a plasma processing chamber.

Claims 1-41 meet the criteria set out in PCT Article 33(4), and thus meet industrial applicability because the subject matter claimed can be made or used in industry.